CONCEPT OF EMPLOYMENT
FOR THE
GLADIATOR TACTICAL UNMANNED GROUND VEHICLE
(NO. INT 12.1.1)

1. INTRODUCTION

a. Purpose. In the conduct of operations, Marine Corps personnel face a myriad of potential hazards to include ambush by unseen enemy forces, detonation of anti-personnel mines or booby traps, and exposure to chemical agents. The Gladiator Tactical Unmanned Ground Vehicle (TUGV) will increase the employing unit's reconnaissance, surveillance, and target acquisition (RSTA) capability and will allow for the remoting of combat tasks such as obstacle breaching. The system will enable tactical commanders to remotely detect, identify, and neutralize a variety of threats while minimizing exposure of friendly forces. The Gladiator TUGV system will possess a modular configuration and be capable of employing a variety of mission modules. These modules will be simple to install in a field environment, allowing commanders to increase their operational capability by tailoring the capabilities of the Gladiator TUGV to best meet their mission requirements.

b. Scope. This Concept of Employment addresses the operational employment and associated command and control considerations for the Gladiator TUGV.

2. MISSION

a. The Gladiator TUGV will provide the Ground Combat Element with an unmanned, all weather RSTA and scouting capability in order to reduce risk and neutralize threats. The system will aid in the observation of tactical objectives and danger areas beyond the using unit's line of sight. Operating forward of GCE units, the Gladiator will perform scouting and RSTA tasks while permitting the operator to remain covered and concealed some distance away (2-4 km), thereby reducing the exposure of individual Marines to hostile enemy action. The Gladiator is designed to support dismounted ground forces during the performance of their mission, across the spectrum of conflict and range of military operations.

b. The Gladiator TUGV will utilize a modular configuration and will be capable of employing the Anti-Personnel/Obstacle Breaching System (APOBS), M249 Squad Automatic Weapon and M240G Medium Machine Gun, and currently fielded chemical detection systems. With the development of future Mission Payload Modules (MPM), projected operational capabilities may include: obscurant delivery, non-lethal weapons, communications relay, engineer reconnaissance, tactical deception (electronic and acoustic), combat resupply, tactical casualty evacuation, or counter sniper employment.

c. The Gladiator will be expeditionary in nature: inherently simple to use, survivable, durable, multi-functional, and easily transported and operated in the littoral battlespace. The system will not increase the expeditionary embarkation footprint or manpower requirements of GCE units. The Gladiator will use designated, vice dedicated, operators and organic vehicles for transportation.

3. THREAT. Potential threats confronting the United States in the near-to-long range period are outlined in the Marine Corps Strategy 21, dated November 2000. Threats confronting Marine Corps forces are also documented

in the Marine Corps Intelligence Activity Mid-Range Threat Estimate 1997-2007 dated August 1997, various Defense Intelligence Agency (DIA) scientific and technical reports, and general military intelligence studies. These documents describe the expanding capabilities of potential enemies in all aspects of warfare and OOTW. Marine Corps forces must be prepared to deploy worldwide to deter aggression and if necessary, defeat threat forces which will range from light infantry and insurgent forces to heavily mechanized and or armored formations with large amounts of artillery. These potential threats will continue to increase as the proliferation of modern weapon systems and technological advances continue throughout a multi-polarized world. Future battlefields are expected to be non-linear, faster paced, less dense and more lethal.

a. Threats to be Countered. The Gladiator will reduce threats presented by the current need to have Marine Corps personnel perform scouting, surveillance, target acquisition, and obstacle breaching missions, where the threat of enemy contact is highly probable. In the conduct of such operations, Marine Corps personnel face a myriad of potential hazards to include ambush by unseen enemy forces, detonation of anti-personnel mines or booby traps, and exposure to chemical hazards.

b. Projected Threat Environment. Marines Corps forces must be prepared to deploy worldwide in order to deter aggression, and if required, defeat threats across all levels of the spectrum of conflict, in compliance with the Defense Planning Guidance for Fiscal Year 2002-2007, dated April 2000.

c. System Vulnerability. In general, weapons that threaten the individual Marine will also effect the Gladiator. The Gladiator system is vulnerable to the following:

(1) Detection. The system’s visual, acoustic, and RF signatures make it vulnerable to detection by the enemy. Additionally, the system’s communications links may be vulnerable to detection, location, interception, jamming, or exploitation.

(2) Enemy Deception. The Gladiator’s optical sensors will be susceptible to counter measures, deception, and camouflage. For example, the enemy may employ artillery and mortar-fired obscurants and retro-reflective agents to degrade the system’s capabilities.

(3) Destruction. The Gladiator will be vulnerable to direct and in-direct fire from artillery, mortars, tank cannon, rockets, machine guns, etc. The MBU and/or attached MPM may be neutralized due to destruction of the sensors or drive train system.

(4) Lack/Loss of Mobility. Limitation in mobility due to impassable terrain and natural or man-made obstacles could preclude the system from being effectively employed. The system may become disabled if it rolls over and is unable to right itself.

4. DESCRIPTION

a. System Description. The Gladiator TUGV is a robust, compact, unmanned, tele-operated, multi-purpose ground RSTA vehicle system possessing a scouting, RSTA, obstacle breaching, NBC detection, and direct fire

capability. The configuration of the TUGV system will consist of three major subsystems:

(1) A highly mobile and survivable Mobile Base Unit (MBU) possessing day and night video cameras, GPS, laser rangefinder, and an acoustic detection system. The MBU will also be capable of accommodating modular, plug-and-play payloads.

(2) Interchangeable Mission Payload Module (MPM) packages capable of supporting the different mission requirements. These payloads include the Anti-Personnel/Obstacle Breaching System (APOBS), M249 squad automatic weapon & M240G medium machine gun, and currently fielded chemical agent detection systems.

(3) A man wearable, hand held Operator Control Unit (OCU) for remote operation of the platform/payloads and data reception from the sensors. The OCU will provide the Gladiator with tele-operational capability for remote command and control of the vehicle as well as data display, storage and dissemination.

b. Equipment Replaced. Fielding of this system will not result in the replaced of any currently fielded equipment or system.

c. Capability Increase. This system will increase MAGTF capabilities by:

(1) Enhancing the ability of tactical commanders at the battalion level and below to rapidly detect, identify, locate, and neutralize a variety of threats to include enemy force activity, chemical and biological agents, and impassible terrain or unusable routes.

(2) Providing real-time combat information to tactical commanders, thus providing them with additional time and space to effectively make decisions and execute plans to maximize the effects of combat power upon decisive enemy vulnerabilities.

(3) Increasing survivability and reducing attrition of Marine Corps forces. Remoting combat tasks (i.e., conducting instride breaches) will help to minimize risk to individual Marines by eliminating or reducing their exposure to enemy direct/in-direct fires.

(4) Maximizing Economy of Force efforts through the conservation of personnel and reduction of risks in secondary areas/efforts.

(5) Providing the capability for the remote application of obscurants during MOUT operations or non-lethal weapons during OOTW operations.

5. ORGANIZATION

a. System Location/Distribution. The Gladiator TUGV will be organic to infantry battalions and combat engineer companies, under the staff cognizance of the S-3. Three systems will be distributed to each infantry battalion and combat engineer company.

b. Personnel Requirements. The Gladiator TUGV will use designated, vice dedicated, operators and organic vehicles for transportation. System

operators will be assigned as a collateral duty for existing personnel. Each Gladiator TUGV will be operated by a single Marine.

c. Organizational Structure Requirements. The Gladiator will be supported within the force structure of the existing organization.

d. Mission Requirements/Tactical Structure. The mission requirements and tactical structure pertinent to the employment of the Gladiator systems will vary depending on the contingency and subsequent task organization.

6. TRAINING

a. New Skills/Training Requirements. Gladiator TUGV operation will require new skills training in the areas of system specific maintenance and operation.

b. Training Methods and Locations. Manufacturer/factory representatives will provide new equipment training for instructors, operators, and maintenance personnel during initial fielding. A stand alone curriculum will be developed for unit level training. Unit level training will be monitored by the battalion S-3 and provided by those Marines who participated in the initial contractor supported training. If desired, Division schools may conduct a 5 to 10 day course for those Marines designated as system operators. Operator training will be accomplished at the unit level by on-the-job-training (OJT) and use of standard curriculum. Embedded training hardware and software capable of providing simulation to support training in equipment operation and navigation will be incorporated to assist in training under the designated, vice dedicated, system operator concept. Particular emphasis shall be given to using training devices, embedded/onboard training, distributed interactive simulation, and interactive courseware. Eventually, a familiarization class may be conducted at the School of Infantry. Formal maintenance training will be incorporated into existing school curricula for each of the major components of the Gladiator system.

7. OPERATIONAL CONCEPT

a. The Marine Corps' vision for employing unmanned ground systems, now and in the future, will be to seize every opportunity to leverage technology to minimize risk, neutralize threats, and conduct operations across the spectrum of conflict. Unmanned technologies will also be leveraged to enhance force capabilities to effectively and efficiently achieve operational endstates. These unmanned ground systems will be expeditionary in nature: survivable, durable, multi-functional, and easily transported and operated in the littoral battlespace. In pursuit of economy of force, the Marine Corps will take advantage of emerging technologies to remote current organic capabilities in order to minimize risk and neutralize threats to the MAGTF.

b. In the conduct of Expeditionary Maneuver Warfare (EMW), Operational Maneuver From The Sea (OMFTS), Ship To Objective Maneuver (STOM), Sustained Operations Ashore (SOA), and Operations Other Than War (OOTW), the TUGV will enhance the ability of Marines to accomplish assigned mission tasks. Operating well forward of GCE units, the TUGV will perform RSTA, scouting, obstacle breaching, NBC detection and direct fire while permitting Marines to remain covered and concealed. The TUGV will significantly enhance the ability of tactical units to rapidly detect, locate, and track close-in threats (natural, man-made, or enemy forces).

c. As part of an evolutionary acquisition strategy, the system will be modular and expandable to support the easy development and integration of future Mission Payload Modules (MPM). Future MPMs, tailored to specific applications, will be developed to support emerging requirements and pre-planned product improvements. These modules will be simple to install in a field environment, allowing commanders to increase their operational capability by tailoring the capabilities of the Gladiator to best meet their mission requirements. With the development of future MPMs, the Gladiator operational capabilities may include:

(1) obscurant delivery;

(2) non-lethal weapons employment;

(3) engineer reconnaissance;

(4) communication relay;

(5) tactical deception (electronic and acoustic);

(6) combat resupply;

(7) tactical casualty evacuation;

(8) and counter sniper employment.

8. Employment Tactics. The Gladiator will reduce risks, neutralize threats, and give commanders additional capabilities in the following areas:

a. Offensive Operations

(1) Movement to Contact

(a) Advance Guard. Utilizing its sensors, the Gladiator may be deployed with the advance party in order to detect enemy units, obstacles (anti-personnel/anti-vehicular), chemical agents, and obtain information concerning the terrain or presence of non-combatants. Once contact with the enemy is achieved, the system could be utilized to maintain visual contact with enemy forces. The most significant aspect of this capability is that the Gladiator extends the eyes in front of the advancing unit, thereby permitting an earlier detection of enemy units and actions while reducing risks to friendly forces.

1. Chemical Agent Detection. A point chemical detector mounted on the basic system will provide early warning of the presence of chemical agents.

2. Obstacle and Mine Breaching. The Gladiator will be capable of employing the Anti-Personnel Obstacle Breaching System (APOBS), thus allowing units to quickly conduct in-stride breaching of wire obstacles and AP mine fields, without exposing Marines to the enemy’s direct fires. This ability to respond quickly to enemy obstacles will assist commanders in maintaining momentum and contact with the enemy by decreasing the amount of time required to breach such obstacles.

3. Fires. Future Gladiator mission payload modules (MPMs) may carry additional lethal and non-lethal weapon systems. The Gladiator could engage the enemy's outposts and screens with direct fire, or assist in effectively employing indirect fires to suppress or fix enemy units. This would free maneuver units to carry out their assigned tasks and sustain the momentum of the main body.

(b) Flank Security and Rear Guard. The system could be utilized to provide flank and rear guard security. The Gladiator's speed would allow it to cover more ground than would be possible by dismounted Marines. Additionally, this would reduce the risk of having infantry flanking units or rear guards cut-off from the main body.

(c) Reconnaissance in Force. The Gladiator will provide enhanced protection when conducting reconnaissance in force operations. By deploying the Gladiator to suspected enemy positions, a commander can minimize the risk of chance enemy contact, defeat enemy deception efforts, and reduce the exposure of his force to enemy action. By employing the Gladiator in this economy of force role, the commander gains time for combat decisions and space for maneuver. Additionally, threat units are forced to fight prematurely in a manner, time, and place not of their choosing.

(d) Obscurant Dispensing. Future MPMs may use visual, bi-spectral, multi-spectral and special-purpose smoke/obscurants to degrade the enemy's ability to see and use its RSTA assets, deceive the enemy, conceal friendly forces, and degrade or defeat directed-energy weapons.

(2) Attack

(a) Scouting and Surveillance. The Gladiator can increase the ability of Marine Corps forces to locate gaps in enemy defenses. The system's mobility, array of sensors, and communication capability make it possible for the Gladiator to roam the battlefield and provide real-time information to tactical commanders. In addition, when exploiting a physical gap there is always a concern as to whether or not the gap is real or a decoy. If the enemy is employing a mobile defense, he will often create "killing zones" that appear to be gaps. The Gladiator could lead the way into these "gaps" and continue to provide scouting and surveillance. The Gladiator could detect the presence of enemy personnel, minefields, etc., thereby alerting the main effort or exploitation force.

(b) Security. Same as paragraph 3a(1)(b). The Gladiator may assist commanders in isolating objective areas by providing early warning of counterattacks and may facilitate engaging reinforcing enemy units with direct and indirect fires.

(c) Reconnaissance in Force. Same as paragraph 4a(3)(a)1(c).

(d) Feint/Decoy and Deception. Future MPMs could have the capability to emit false visual, acoustic, and electromagnetic signatures to confuse and mislead the enemy. Decoy and deception efforts could be used in conjunction with manned assets to increase the apparent size and strength of friendly units. The mobility inherent in the Gladiator system may allow electronic emitters to resemble a maneuver element.

(e) Obscurant Dispensing. Future MPMs could use visual, bi-spectral, multi-spectral and special-purpose smoke/obscurants to degrade the enemy's ability to see and use its RSTA assets, deceive the enemy, conceal enemy forces, and degrade or defeat directed-energy weapons. The Gladiator would not be hindered by an NBC environment and would allow the employment of long-term smoke forward of friendly forces. Using the Gladiator to dispense obscurants would provide mobility to sustained smoke/obscurant operations, enable precise emplacement of obscurants and avoid the possibility of artillery batteries receiving counterbattery fire as a result of delivering obscurants.

(f) Obstacle Breaching. The Gladiator will be used to conduct in-stride breaches by employing the Anti-Personnel/Obstacle Breaching System (APOBS) to neutralize mines, wire, or other obstacles. Since enemy suppressive fires will cover many of these obstacles, the Gladiator will reduce the vulnerability of manned breaching units by providing a means of conducting a standoff breach. Additionally, the Gladiator can employ obscurants and direct fire MPMs to assist in conducting the breach.

(g) Direct Fire. The Gladiator could carry lethal and non-lethal weapon systems, such as the M240G medium machine gun MPM. The Gladiator could directly engage the enemy's outposts and security elements with suppressive fire. This would free manned maneuver units to carry out their mission essential task. Additionally, the Gladiator will enable the GCE to gain overwhelming combat momentum and maintain necessary operational tempo.

(h) Target Acquisition and Control of Supporting Arms. The Gladiator will have the capability to rapidly detect, identify, and accurately locate enemy targets to within a 10 meter accuracy. The Gladiator will allow operators to initiate and adjust observed indirect fires upon the enemy, thus maximizing the responsiveness and precision of organic supporting arms.

(i) Chemical and Biological Agent Detection and Contamination Mapping

1. Detection. The Gladiator will be used to detect and/or classify the type and level of chemical contamination in advance of Marine units. This will allow personnel to either avoid the contaminated area or to take appropriate protective measures. To achieve this capability, the system will be capable of employing currently field point chemical agent detection alarms.

2. Contamination Mapping. The system could be used to reconnoiter suspected contaminated areas without risk to personnel, continuously taking samples throughout the area. These samples could then be used by NBC personnel to synthesize a contour map of the area to show the extent of contamination and the best possible path around or through the contaminated area.

(3) Exploitation/Pursuit. The Gladiator can be used to exploit the success of offensive operations by maintaining contact and pressure on withdrawing enemy forces. Gladiator employment will enhance the ability of attacking units to effectively pursue the enemy by fire (direct and indirect) and maneuver.

b. Defensive Operations

(1) Security Forces. Generally, commanders extend security areas as far forward as is tactically feasible so as to inflict maximum damage and disruption to attacking enemy forces by the time they reach the main battle area. The security forces, who are located in the forward portion of the security area, have the mission to provide early warning of the enemy advance; to engage the enemy in order to damage, delay, and disrupt him; and to deceive the enemy as to the true location of the main battle area. As the enemy closes, the security force will maintain contact while falling back under pressure. Gladiators that are assigned to the security force could perform the following tasks:

(a) Scouting and Surveillance. The Gladiator could be positioned forward of the security force, thereby creating greater depth to the position. Using its sensors and communications capabilities, the Gladiator would transmit warning information to the security force and main effort. Before the enemy arrived, the Gladiator would conduct a surveillance of the area surrounding its position. Key terrain features would be selected and the laser range finder employed to determine range and bearing from the Gladiator. As enemy forces approach, the operator could utilize the Gladiator's sensors to call for and adjust indirect fires.

(b) Patrolling. The Gladiator could move throughout the zone of action detecting enemy units, activities, and obtaining information concerning the terrain or presence of non-combatants. Sectors that appear to be the most probable for enemy contact would be assigned to the Gladiator, thereby minimizing risk to individual Marines. The on-board sensors would be capable of detecting and locating enemy forces, transmitting this data to the OCU. The OCU operator would pass along this information to the appropriate agencies.

(c) Decoy and Deception. Future MPMs could be employed to confuse and mislead the enemy as to the strength, disposition, and actions of friendly forces. This would facilitate in provoking enemy forces to deploy prematurely and disrupt their attacks.

(d) Target Acquisition and Control of Supporting Arms. Once the Gladiator's sensors detect the enemy, the security force could adjust observed indirect fire against the enemy.

(e) Direct Fire. The Gladiator would augment combat units by allowing system operates to utilize direct fire weapons to cover obstacles or engage combatants in order to repel enemy assaults. In delay operations, the system would inflict the greatest possible damage to enemy forces while providing the using unit freedom of action. In withdrawals, the system would engage the enemy with suppressive fires, allowing friendly forces to more safely disengage.

(f) Counter-Attack. During the planning phase, the Gladiator can be sent out to reconnoiter possible axes of advance and routes of attack, obtaining information on terrain, obstacles, etc. During the actual counter-attack phase, the Gladiator could be sent out ahead of the counter-attack

force to detect the presence of enemy troops, obstacles, or ambushes. Once contact with the enemy is made, the direct fire capabilities of future MPMs may be utilized to provide suppressive fire, allowing the counter-attack force the ability to maneuver against the threat.

(g) Stay-Behind Forces. The Gladiator is well suited for the accomplishment of stay-behind operations. The security force would carefully position and camouflage several of the Gladiators to remain in the security area. As enemy pressure is exerted on the security force, friendly units would withdraw to previously selected positions, while the Gladiator maintained observation of enemy forces during the displacement of the security force to the main battle area.

c. Operations Other Than War

(1) MOUT

(a) Scouting and Surveillance. Movement of MAGTF elements through an urban environment exposes them to enemy ambushes. The Gladiator can be employed as the point element, using its visual and acoustic sensors to detect the presence of enemy forces and non-combatants along the selected route of patrol. Once the enemy has been located, the Gladiator could use the same sensors to maintain continuous surveillance of the threat until the MAGTF can undertake appropriate action against the enemy or engage them with direct/in-direct fire.

(b) Target Acquisition and Control of Supporting Arms. The use of supporting arms in an urban environment must be conducted with surgical precision. In the future, Gladiators utilizing a laser designator MPM, could guide a "smart" weapon into the designated spot. The Gladiator will also facilitate the rapid battle damage assessment of these engagements.

(c) Direct Fire. Once the Gladiator has located enemy forces, Marines could use the system to attack targets with precise accuracy, using either non-lethal or lethal payloads.

(d) Obscurant Delivery. The basic Gladiator system could be used in conjunction with smoke pots currently in inventory to deceive the enemy and conceal friendly forces, thus degrading the enemy’s ability use its RSTA assets and direct fire weapons. Additionally, the Gladiator could be fitted with a future mission module capable of dispensing obscurants on an extended basis. This would provide mobility to sustained smoke/obscurant operations and enable precise emplacement of obscurants.

(e) Chemical and Biological Agent Detection. While the use of casualty-producing chemical and biological agents in an urban environment is remote, there have been cases in recent years where such agents have been used against civilians. The Gladiator, using its chemical sensors, would alert MAGTF forces to the presence of chemical or biological agents and provide advance warning so that appropriate protective actions may be implemented. The Gladiator could be used in a contamination mapping role by reconnoitering suspected contaminated areas without risk to personnel, continuously taking samples throughout the area. These samples would then be synthesized into a contour map of the area showing the extent of contamination. This data could then be used to warn the local civilian

authorities and populace, or to show the best possible path around or through the contaminated area.

(f) Obstacle Breaching. The Gladiator can be used to conduct in-stride breaches by neutralizing mines, barricades, wire, bunkers or other obstacles. Since enemy suppressive fires will cover many of these obstacles, the Gladiator will reduce the vulnerability of breaching forces by providing a means to conduct the breach in a standoff employment posture

(g) Building Clearing/Demolition

1. Building Clearing. The Gladiator could be employed inside large buildings or warehouses so as to determine the tactical situation prior to having Marines enter. If the sensors locate threats, the operator could utilize a variety of MPMs to neutralize the threat. Additionally, the system could employ non-lethal incapacitating agents to clear buildings and areas in which the enemy is concealed amidst the civilian population.

2. Building Demolition. The Gladiator could be employed to neutralize bunkers or enemy positions by precisely delivering explosives into that portion of a built up area that is occupied by snipers or combatants.

(f) Counter Sniper. Future MPMs could include the capability to rapidly detect and accurately locate the position of snipers. The operator could then use the system's direct fire capability to neutralize the target with precision fire. In this role, the Gladiator could be used in vulnerable locations where there is a high degree of risk to manned assets.

(g) Crowd Control. As a riot-control asset, the Gladiator could remotely dispense riot-control agents. The system would provide a spray versus a burst of agent, allowing for greater precision in the delivery of riot-control agents.

(h) Tactical Resupply. The Gladiator could be used to ferry ammunition, medical supplies, etc. in situations where the risk of having personnel perform this task is too great (i.e. having to cross and open area to resupply Marine forces that are pinned down).

(i) Tactical Casualty Evacuation. As evident from previous real-world MOUT missions, it is highly probably that Marine forces may endure casualties from snipers, etc. In the event a Marine were to go down in an open area, rendering those providing aid susceptible to enemy fire (i.e. road crossing, etc.), the Gladiator could be used to provide cover for the injured Marine or withdraw him to a safe location.

(j) Communication Relay. The Gladiator could be fitted with a communications mission module. In this role the system would serve as a relay between Marine ground forces and other UGVs, UAVs, and national assets.

(2) Peacekeeping/Enforcement Operations. Using its onboard visual sensors, the Gladiator could provide surveillance, transmitting images and information directly to the security force or MAGTF Command Element. Additionally, the system could provide visual documentation of any peace agreement violations. As a riot-control asset, the Gladiator could remotely dispense riot-control agents.

(3) Antiterrorism/Force Protection Operations

(a) Security. It is standard procedure for the MAGTF to create a buffer zone around obstacles, checkpoints, defensive positions, and cantonments. The Gladiator, maintaining surveillance with visual and acoustic sensors, could patrol the outer edges of this zone. Friendly forces could then be located several hundred meters away, where they could cover the Gladiator, yet remain safe from close-in surprise attacks. By installing a loudspeaker/intercom with the Gladiator, anyone approaching the site could be interrogated via the Gladiator and appropriate action could be initiated when required. When hostile actions occur against either the Gladiator or the defensive installation, the system operator could use the Gladiators on-board direct fire weapons (lethal or non-lethal) on a selective basis.

(b) Bomb Detection/Disposal. Future MPMs could be capable of remote detection/handling of explosive devices, providing a means for their disposal. This would reduce the risk to EOD Marines by eliminating the need for them to approach/handle such devices.

9. EMPLOYMENT PREREQUISITES

a. A Marine Corps Unmanned Ground Vehicle Operations Concept should be published.

b. A Tactics, Techniques, and Procedures manual for Marine Corps Unmanned Ground Vehicle Operations should be published.

10. MISSION PLANNING FACTORS. The Gladiator TUGV’s ability to collect data on the enemy should be part of the commander's data collection plan. However, to fully capitalize on the Gladiator TUGV's effectiveness, mission planning will have to take into consideration all of the capabilities offered by the system (RSTA, obstacle breaching, direct fire, NBC detection).

11. MISSION EXECUTION FACTORS. Mission execution factors will be based on information provided in operation plans/orders and unit Standing Operating Procedures.

12. CONTROL

a. Offensive Operations. In offensive operations the TUGV will frequently by used as the lead element in the advance guard. If the limit of advance is expected to be less than 4 kilometers, the OCU could remain stationary and control the Gladiator(s). If the advance is expected to go beyond 4 kilometers, control would be maintained with one of three options:

(1) The OCU could follow in trace of the Gladiators, but far enough to the rear to allow the operator and supported unit to remain outside the max effective range of enemy direct fire.

(2) With the OCU stationary, the Gladiator could be run out to its extreme range, at which time it would be halted while the OCU is brought forward. Then the Gladiator would be sent out again.

(3) Two Gladiator systems could work in concert to create a “bounding overwatch” effect. With this method, one OCU operator would control two systems, or two OCU operators control one system. In this

situation, one OCU operator would have control of the system(s), while the other operator would be moving forward to reposition himself to more effective control the system(s), yet remain far enough to the rear of the system so as to remain beyond the range of enemy direct fire weapons. Once established, control of the systems would be passed to the lead operator, allowing the more distance operator to move forward, thus ensuring constant control of the systems.

b. Defensive Operations. In the defense, the primary control link between the OCU and TUGVs would fiber-optic cable. The advantages of the fiber optic link is that it eliminates the RF signature and reduces power requirements of the system. The RF link would automatically be activated in the event of a break in the cable or if desired by the system operator in order to conduct patrolling.

13. SECURITY. The Gladiator must comply with current requirements and be capable of evolving to meet state-of-the-art technological advances designed to protect information from unwanted exploitation as imposed by national, DoD, and joint policy. The Gladiator must be protected from an Information Systems Security (INFOSEC) perspective, which would include, but not be limited to, such services as confidentiality, availability, and integrity of information that is either processed, stored, or transmitted. The system will also deny the enemy's use of the system through an anti-tampering capability that can be easily engaged for wartime employment and acts to disable the MBU and clears the memory and codes in any classified hardware and software.

14. MOBILITY TRANSPORTABILITY. Two Gladiator systems and their associated equipment shall be capable of being transported inside the back of a single HMMWV without requiring any permanent modifications to the vehicle. A single Gladiator system will be capable of being transported inside an AAV and on a M101A3 HMMWV trailer. Additionally, the Gladiator will be capable of being internally air transported by MV-22 and larger fixed-wing aircraft, and CH-46 and CH-53 rotary-wing aircraft. The system will also be capable of helicopter external air transport and will be transportable by amphibious ships and landing craft.

15. SAFETY. The Gladiator system shall comply with all applicable safety and health requirements so as not to present uncontrolled safety and health hazards to the system operators or maintenance personnel throughout its life cycle. Every effort will be made to minimize risk of MBU rollovers while maneuvering. Additionally, if the Gladiator experiences a system failure, it shall fail in a safe mode.

16. MISSION EFFECTIVENESS CRITERIA. Mission Effectiveness Criteria and Performance Objectives are listed in the Operational Requirements Document (ORD) for the Gladiator Tactical Unmanned Ground Vehicle (No. INT 12.1.1).